UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,086	05/31/2001	Ari P. Heikkinen	456-010392-US(PAR)	9314

2512 7590 03/13/2009

PERMAN & GREEN
425 POST ROAD
FAIRFIELD, CT 06824

EXAMINER	
VO, HUYEN X	

ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
03/13/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/871,086	HEIKKINEN, ARI P.	
	Examiner	Art Unit	
	HUYEN X. VO	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 May 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's arguments filed 3/17/2008 have been fully considered but they are not persuasive. Rothweiler et al. fully anticipate the claimed limitation regarding "determining an average pitch period by summing differences between successive pitch pulse locations within said formulated signal divided by the number of said differences between successive pitch pulse locations" in that an final pitch is determined by taking average of a plurality of "pitch intervals" (*col. 10, lines 22-35, particularly lines 30-33; also referring to col. 8, line 10 to col. 10, line 15 for detailed discussion of Pitch Epoch Detection 220 and Periodicity Analysis 230 in figure 2A*). These "pitch intervals" inherently suggest that there is a starting point and an ending point for each pitch interval. These starting and ending points are considered the same as "pitch pulse locations" as claimed.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3, 8, 10-12, 14-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chong et al. (USPN 6590946, already of record) in view of

Rothweiler et al. (USPN 5649051, already of record), and further in view of Li et al. (IEEE Publication, from IDS).

4. Regarding claims 1, 8, and 15, Chong et al. disclose a method, apparatus, and network element of encoding speech comprising the steps of:

formulating a jittery speech signal from utterances spoken by a speaker (*element 100 in figure 1*);

determining an estimate of pitch period from said formulated signal (*element 103 in figure 1 or referring to col. 4, line 48 to col. 5, line 17*);

using said estimate of pitch period to determine pitch pulse locations within said formulated signal (*element 104 in figure 1*);

modifying the formulated signal using said average pitch period such that the pitch pulses are spaced substantially equally along a time axis and thus, changing a pitch periods of said formulated signal improving periodicity by removing the jitter from the formulated signal thereby enabling a more accurate determination of at least one voicing parameter of the modified signal (*figure 2 or col. 5, lines 29-63*);

determining said at least one voicing parameter based on the formulated signal, the voicing parameter being either voiced or unvoiced, to enable a selection of encoding mode (*element 103 in figure 1, voicing classification*);

deciding the encoding method based on said at least one determined voicing parameter (*end result of figure 2 is extracted for coding; only one coding method is claimed*); and

encoding the modified signal in a speech encoder (*end result of figure 2 is extracted for coding*).

Chong et al. fail to specifically disclose the steps of determining an average pitch period by summing differences between successive pitch pulse locations within said formulated signal divided by the number of said differences between successive pitch pulse locations; and determining said at least one voicing parameter based on the modified signal, the voicing parameter being either voiced or unvoiced. However, Rothweiler et al. teach the step of determining an average pitch period by summing differences between successive pitch pulse locations within said formulated signal divided by the number of said differences between successive pitch pulse locations (*col. 10, lines 22-35, particularly lines 30-33; also referring to col. 8, line 10 to col. 10, line 15 for detailed discussion of Pitch Epoch Detection 220 and Periodicity Analysis 230 in figure 2A; "average the pitch intervals" inherently indicates that each pitch interval has a duration from a starting point to an ending point. These points are the same as pitch pulse locations as claimed*).

Since Chong et al. and Rothweiler et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Chong et al. by incorporating the teaching of Rothwieler et al. in order to improve pitch determination accuracy for the modified signal.

The modified Chong et al. still fail to specifically disclose the step of determining at least one voicing parameter based on the modified signal, the voicing parameter

being either voiced or unvoiced. However, Li et al. teach the step of determining at least one voicing parameter based on the modified signal, the voicing parameter being either voiced or unvoiced (*encoder part in figure 3, output of the signal modification block is inputted to the input of the V/UV estimation unit*).

Since the modified Chong et al. and Li et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Chong et al. by incorporating the teaching of Le et al. in order to improve voiced/unvoiced detection accuracy.

5. Regarding claim 12 Chong et al. disclose a mobile device comprising:

a speech coder (*end result of figure 2 is extracted for coding*);

means for formulating a speech signal from utterances spoken by a speaker (*element 100 in figure 1*);

means for determining an estimate of pitch period from said formulated signal (*element 103 in figure 1 or referring to col. 4, line 48 to col. 5, line 17*);

means for using said estimate of pitch period to determine the location of at least one pitch pulse within said formulated signal (*element 104 in figure 1*);

means for modifying the formulated signal using the periodicity estimate such that the pitch pulses are spaced substantially equally along a time axis and thus, changing a pitch periods of the formulated signal improving periodicity (*figure 2 or col. 5, lines 29-63*);

means for determining at least one voicing parameter based on the formulated signal, the voicing parameter being either voiced or unvoiced (*element 103 in figure 1, voicing classification*);

means for deciding the encoding method based on at least one determined voicing parameter (*end result of figure 2 is extracted for coding; only one coding method is claimed*); and

means for encoding the modified signal in a speech encoder (*end result of figure 2 is extracted for coding*).

Chong et al. fail to specifically disclose the steps of determining an average pitch period using said location of at least one pitch pulse; and determining at least one voicing parameter based on the modified signal, the voicing parameter being either voiced or unvoiced. However, Rothweiler et al. teach the step of determining an average pitch period using said location of at least one pitch pulse (*col. 10, lines 22-35, particularly lines 30-33; also referring to col. 8, line 10 to col. 10, line 15 for detailed discussion of Pitch Epoch Detection 220 and Periodicity Analysis 230 in figure 2A*).

Since Chong et al. and Rothweiler et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Chong et al. by incorporating the teaching of Rothwieler et al. in order to improve pitch determination accuracy for the modified signal.

The modified Chong et al. still fail to specifically disclose the step of determining at least one voicing parameter based on the modified signal, the voicing parameter

being either voiced or unvoiced. However, Li et al. teach the step of determining at least one voicing parameter based on the modified signal, the voicing parameter being either voiced or unvoiced (*encoder part in figure 3, output of the signal modification block is inputted to the input of the V/UV estimation unit*).

Since Chong et al. and Li et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Chong et al. by incorporating the teaching of Le et al. in order to improve voiced/unvoiced detection accuracy.

6. Regarding claim 3, Chong et al. fail to specifically disclose the method according to claim 1 wherein said determining the average pitch period comprises summing the difference between successive locations between each of at least two of the at least one pitch pulses. However, Rothweiler et al. teach wherein said determining the average pitch period comprises summing the difference between successive locations between each of at least two of the at least one pitch pulses (*col. 10, lines 22-35, particularly lines 30-33; also referring to col. 8, line 10 to col. 10, line 15 for detailed discussion of Pitch Epoch Detection 220 and Periodicity Analysis 230 in figure 2A*).

Since Chong et al. and Rothweiler et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Chong et al. by incorporating the teaching of Rothwieler et al. in order to improve pitch determination accuracy for the modified signal.

7. Regarding claim 10, 14, and 18, Chong et al. fail to specifically disclose an apparatus, mobile device, and network element, according to claims 8, 12, and 15, respectively, wherein the apparatus includes a memory comprising a software operating with a signal processor for providing means for transforming, estimating, and modifying the speech signal. However, it would have been obvious to one of ordinary skill in the art at the time of invention to write a software program performing the method taught by Chong et al. in order to minimize cost of maintaining and updating of system.

8. Regarding claims 11 and 16, Chong et al. fail to specifically disclose that the apparatus is integrated into a mobile device functioning with a wireless telecommunication network. However, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the method taught by Chong et al. in mobile telephone order to improve the performance of compressing digitized speech data for transmission over digital communication channels.

9. Claims 2, 9, 13, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chong et al. (US 6590946) in view of Rothweiler et al. (US 5649051), in view of Li et al. (IEEE Publication, from IDS), and further in view of Manjunath et al. (US 6456964).

10. Regarding claim 2, Chong et al. fail to specifically disclose a method according to claim 1 wherein the formulated speech signal is a digitized signal such as a residual signal produced from a coding algorithm such as Linear Predictive Coding (LPC) or the actual speech signal itself. However, Manjunath et al. teach that the formulated speech signal is a digitized signal such as a residual signal produced from a coding algorithm such as Linear Predictive Coding (LPC) or the actual speech signal itself (*col. 5, lines 45-54*).

Since Chong et al. and Manjunath et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Chong et al. by incorporating the teaching of Manjunath et al. in order to achieve low bit rate while improving speech quality of reconstructed signal.

11. Regarding claims 9, 13, and 17, Chong et al. fail to specifically disclose an apparatus, mobile device, and network element, according to claims 8, 12, and 17, respectively, wherein the formulating means includes software operating with a signal processor that is capable of generating a residual signal from a speech signal (*col. 21, lines 30-45*). However, Manjunath et al. teach that the formulating means includes software operating with a signal processor that is capable of generating a residual signal from a speech signal (*col. 21, lines 30-45*),

Since Chong et al. and Manjunath et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art

at the time of invention to modify Chong et al. by incorporating the teaching of Manjunath et al. in order to encode signal at low bit rate while maintaining good speech quality.

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chong et al. (US 6590946) in view of Rothweiler et al. (US 5649051), in view of Li et al. (IEEE Publication, from IDS), further in view of Manjunath et al. (US 6456964), as applied to claim 3, and further in view of Kleijn et al. (US 6223151).

13. Regarding claim 5, the modified Chong et al. fail to specifically disclose that the modifying step further comprises the speech signal being upsampled by interpolation such that suitable discrete values of the upsampled signal are shifted to conform to the average pitch cycle. However, Kleijn et al. further teach that the speech signal being upsampled by interpolation such that suitable discrete values of the upsampled signal are shifted to conform to the average pitch cycle (*Interpolator 140 of figure 1*).

Since the modified Chong et al. and Kleijn et al. are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention further modify Chong et al. by incorporating the teaching of Kleijn et al. in order to enable the speech encoder to encode speech signal such that good signal quality is preserved when decoded by the decoder.

14. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chong et al. (US 6590946) in view of Rothweiler et al. (US 5649051), in view of Li et al. (IEEE Publication, from IDS), in view of Manjunath et al. (US 6456964), in view of Kleijn et al. (US 6223151), as applied to claim 5, and further in view of Kleijn (US 5517595).

15. Regarding claim 7, the modified Chong et al. fail to disclose that the modified signal is down sampled prior to encoding in the speech coder. However, Kleijn (US 5517595) further teaches that the modified signal is down sampled prior to encoding in the speech coder (*col. 11, lines 25-35*).

Since the modified Chong et al. and Kleijn (US 5517595) are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Manjunath et al. by incorporating the teaching of Kleijn (US 5517595) in order to lower bandwidth for the gain below the extraction frequency of the prototype waveform to minimize coding errors.

16. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chong et al. (US 6590946) in view of Rothweiler et al. (US 5649051), in view of Li et al. (IEEE Publication, from IDS), in view of Manjunath et al. (US 6456964), as applied to claim 1, and further in view of Donovan et al. (US 6266637).

17. Regarding claim 6, the modified Manjunath et al. fail to disclose that a pitch scaling algorithm such as Time Domain Pitch Synchronous Overlap-Add (TD-PSOLA) is used to normalize the pitch cycle lengths in an analysis frame. However, Donovan et al. teach that a pitch scaling algorithm such as Time Domain Pitch Synchronous Overlap-Add (TD-PSOLA) is used to normalize the pitch cycle lengths in an analysis frame (*col. 4, lines 1-25*).

Since the modified Manjunath et al. and Donovan et al. are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Manjunath et al. by incorporating the teaching of Donovan et al. in order to minimize signal degradation so to preserve characteristics of the original signal.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUYEN X. VO whose telephone number is (571)272-7631. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Huyen X Vo/ 3/5/2009
Primary Examiner, Art Unit 2626

***